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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

JOHN FRANCIS WILLIAMS.

JOHN FRANCIS WILLIAMS, Ph.D., assistant professor of geology and mineralogy in Cornell University, died at Ithaca Monday evening, Nov. 9, 1891. Although Dr. Williams was only twenty-nine years of age, he had achieved eminent distinction. He took his baccalaureate degree at the Troy Polytechnic Institute, and afterward studied at Göttingen for three years with such success that when his professor, Dr. Klein, went to Berlin, Dr. Williams accompanied him as assistant. Returning to America, he was appointed curator of the mineralogical and industrial collection of the Pratt Institute of Brooklyn, L.I., which, conjointly with Professor Nason of the Rensselaer Polytechnic Institute of Troy, was formed in Europe. He then became docent in Clark University, and afterwards was employed in a very important part of the State survey of Arkansas. In the course of the survey, extending over two years, he collected minerals for a very complete report on the mineralogy and petrography of the State, a volume of some four hundred pages being now in press. Some of his work has been complimented by Dr. Rosenbusch, the greatest living authority, as among the best he had ever seen done by an American.

Dr. Williams had just entered on his work of instruction in Cornell, when it became apparent that he had brought from the malarious regions of Arkansas the seeds of a fatal disease. His instruction was highly praised by his students, and he was universally esteemed by his colleagues.

Dr. Williams was one of the best of the new school of mineralogists, being thoroughly rounded in his knowledge of the science, being an excellent chemist, crystallographer, petrologist, and geologist.

Dr. Williams was born at the old family homestead, in Salem, N.Y. He was the son of John N. Williams, and belonged to one of the oldest families in New York.

Among his published papers were "Eudialyte and Eucolite, from Magnet Cove, Arkansas," in *American Journal of Science*, December, 1890; "Manganopectolite from Magnet Cove," Zeitschrift f. Krystallographie und Mineralogie, P. Groth, Leipzig, November, 1890, pp. 386–389; "Igneous Rocks of Arkansas," Vol. II. of the Publications of the Survey, 1890; "Ueber den Monte Amiata in Toscana und Seine Gesteine" [Mit. Taf., XII.–XVI.]. Neues Jahrbuch für Mineralogie, Geologie und Paleontologie, BB. V. 381, 1886, his most important work; and a volume of some four hundred pages on the mineralogy and petrology of Arkansas, now in press.

THE COMMON EDIBLE CRAB FOUND FOSSIL IN THE HUDSON RIVER TUNNEL.

DURING work on the Hudson River tunnel, as carried on from the New Jersey side, and when at a distance of about 3,100 feet from the New Jersey opening, one of the workmen noticed a hard nodule among the silt as it was being taken out at the heading, and secured it as an object of curiosity. On being washed the nodule, which is about six and a half inches long by two and a half wide and an inch thick, was seen to contain quantities of a small sea shell (*Mactra lateralis* say) and remains of a crab.

Subsequently this nodule, which is of a hard limestone nature on the inside, although soft and muddy externally, came into the possession of William Dutcher, Esq., of this city, who presented it to the American Museum of Natural History, where it will be preserved in section 12 of case Q of the Geological Hall.

On removing some of the stone from the left side of the back, the lateral spine characteristic of our common blue or edible crab (*Cullinectes hastatus*, Fabricus; = *Lupa dicantha*, Latreille, of the New York State Natural History, Zoology, plate III., fig. 3) is shown, which proves it to be an ancient example, about two-thirds grown, of this much esteemed and highly prized frequenter of our city markets, restaurants, and hotels, as well as of many private tables, although at present by no means in the soft shell condition, for the nodule is so hard internally as to yield only to the action of a hammer and chisel; although externally looking like a nodule of hardened mud. The nodule exposes a little more than half of the upper surface of the back, and parts of each of the large claws; and in removing the stone from the surface, impressions of several leaves were exposed, and a fragment of sea grass.

The finding of this species in a fossilized condition, in the position from which it was taken, is a matter of considerable interest, as it is the only instance known of its existence in a fossil condition. It proves this animal to have inhabited the shoals and bays of this region for a period dating back to probably long before the advent of man, for its depth below the bottom of the river at that point, which is about thirty-five to forty feet to the centre of the tunnel, together with its perfectly fossilized condition, would indicate the lapse of considerable time since its entombment.

R. P. W.

ASTRONOMICAL NOTES.

ON May 22, 1886, Mr. W. R. Brooks, then living at Phelps, N.Y., discovered a telescopic comet which has been the subject of an extensive discussion by Dr. S. Oppenheim of Ottakring. He finds that the comet is a short-period one, of from 5.7 to 6.1 years. In No. 3,064 of the *Astronomische Nachrichten* Dr. Oppenheim publishes a sweeping ephemeris covering the period from Jan. 1 to Sept. 17, 1892.

Previous to his death, Professor Theo. Oppalzer had under his charge the orbit of the short-period comet discovered by

Professor Winnecke, at Bonn, on March 8, 1858. This comet was originally discovered by Pons, at Marseilles, on June 12, 1819. Since Oppalzer's death, Dr. Haerdtl of Vienna has taken up the orbit and discussed it, and also computed the perturbations the comet has experienced since last seen. The last return of the comet was in 1886, when it was discovered by Mr. Findlay, at the Cape of Good Hope, Aug. 20. At the time of discovery the comet had passed its perihelion, and was twelve days ahead of its predicted place. Its distance from the earth at the time of discovery was about one hundred and fifty million miles. In No. 3,062 of the *Astronomische Nachrichten* Dr. Haerdtl publishes an ephemeris to assist in finding the comet during its approaching return. The date of next perihelion passage is June 30, 1892. At the present time the comet is about two hundred and fifty millions of miles from the earth, and is of course beyond the reach of all but the most powerful telescopes, and probably even them. In the latter part of next January the comet should be within the reach of moderate-sized telescopes. A copy of the ephemeris will be published before that date.

The following are the positions for Wolf's comet for following dates. The epoch is for Greenwich midnight.

1891.	R. A.			Dec.	
	h.	m.	s.	°	′
Dec. 1.5	4	24	18	—13	22
3 5		23	4	13	43
5.5		21	52	14	0
7.5		20	45	14	15
9.5	4	19	42	—14	27

The eclipse of the moon on the night of the fifteenth of the present month was not generally observed at stations in the eastern portion of the United States, due to a very cloudy sky. The only satisfactory observations, as far as known, were those made at Harvard Observatory. It was cloudy at Albany, Rochester, Princeton, Washington, and the University of Virginia, points at which large telescopes are located. Professor Dölland, late of the observatory at Pulkova, Russia, had prepared a large list of stars that would be occulted during the eclipse. Preparation had been made at the several observatories mentioned to observe as many of these stars as possible, to assist in revising the present value of the semi-diameter of the moon.

FOREST AND MINERAL WEALTH OF BRAZIL.

A BULLETIN lately issued by the Bureau of the American Republics states that the inexhaustible forests of Brazil abound in woods of great value, some of the most beautiful and valuable being entirely unknown in Europe. The large collection of Brazilian woods exhibited in Philadelphia in 1876 attracted much attention, and the catalogue mentions 22,000 different woods found in the valley of the Amazon alone. The best known of the valuable woods among those of the Amazon are rosewood, satin wood, shell wood — of which latter beautiful shell-like articles are made. The cedars of Brazil are entirely different from the European, and they abound everywhere from north to south. During the floods of the Amazon, they are seen borne along by the current, as a writer on Brazil describes them, "mighty trunks of foliage like floating islands." Among the medicinal plants of the Amazon valley may be mentioned the sarsaparilla, ipecacuanha, the polycarp, the cubeb, the curare,— from which the Indians extract the poison for their arrows, — the *nux vomica*, etc. On the Atlantic coast, the variety of valuable woods is continued, and mention may be made of the acapú and angelica, and the bacury, which is the building wood most in use in Maranham.

The forests abound in plants producing textile fibres. A firm at Ceará has lately commenced the manufacture of the *gravatá* fibre, a plant belonging to the *bromeliacea*. The rubber tree exists in several varieties, producing as many different sorts of rubber, and all through the northern regions it thrives well. The once famous Brazil wood, which gave its name to the country, lost its importance with the discovery of the cheaper aniline dyes, and its exportation has dwindled to insignificance. Gutta-percha is produced in Brazil from two species of trees, the jaguá (*Lucuma gigantea*) and the massaranduba (*Mimusops elata*). The beautiful vinhatico, much employed in Brazil for furniture and cabinet work, enjoys a considerable reputation, the greater part of the furniture in Brazil being made either of rosewood or vinhatico. The beautiful shaded yellow of this latter makes it remarkable among the woods at once useful and ornamental.

The development of the vast mineral resources of Brazil, with the exception of gold and diamonds, has only just begun. Its deposits of coal and iron, laid bare by scientific explorers, await for the most part the labor and machinery necessary to utilize them. The existence in Brazil has been demonstrated of copper, manganese, and argentiferous lead ore, in considerable quantities, and in widely extended localities. There are also mines of iron, coal, gold, and diamonds. Gold is found in every State in Brazil, and is systematically mined in Minas Geraes, Rio Grande do Sul, Bahia, Matto Grosso, Parana, Sao Paulo, and Maranham.

Diamonds are co-extensive with the gold-deposits, and, like that metal, are most abundant in Minas Geraes, where they have been found since 1789. The most important locality known for the production of these gems is the district of Diamantina, in the above-named State. They are found in Parana, in the gravels of the river Tibagy, and in the bed of streams dry during the summer. Since the discovery of diamonds at the Cape of Good Hope, the Brazilian production has greatly diminished.

As regards iron, the State of Minas Geraes abounds with it. It is not found in veins or strata, buried deep in the earth, but in enormous beds, often lying at the surface, or in mountain masses. These vast deposits are worked only by small scattered furnaces, charcoal being used in the reduction of the ore. Of these small furnaces there are five groups, producing about 3,000 tons annually, the product being used in the surrounding districts in the manufacture of articles of home consumption, such as hoes, shovels, picks, drills, nails, horseshoes, etc. In the State of San Paulo are found deposits similar to the best Norwegian ore; and one of the mines is worked by the Government establishment, near the village of Sorocaba. This establishment has two furnaces, and produced in one year about 790 tons of pig iron. The ore has about 67 per cent of iron. In Santa Caterina, not far from a harbor accessible to the largest vessels, are vast deposits of hematite, containing on an average 30 per cent of manganese, and 25 to 30 per cent of iron. In the State of Goyaz, as in Minas Geraes, are found enormous masses of the ore itaberite.

The presence of copper has been demonstrated in Rio Grande do Sul, in Matto Grosso, in Minas Geraes, and Ceará. The ore has never yet been mined, but in the last named State works have been begun with a view to its extraction and reduction. The ore, as far as yet reached, yields 40 per